Oracle® OLAP

Developing Analytic Workspace Manager Plug-ins

11*g* Release 1 (11.1)

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This technical note describes how to create a Java plug-in for use with Oracle Analytic Workspace Manager, Version 11.1. With a plug-in, a Java developer can extend the functionality of Analytic Workspace Manager.

This technical note includes the following topics:

- Introducing Analytic Workspace Manager Plug-ins
- Analytic Workspace Manager Plug-in Interface and Example

See Also:

- *Oracle OLAP User's Guide*
- *Oracle OLAP Java API Reference*
- *Oracle OLAP Java API Developer's Guide*

Introducing Analytic Workspace Manager Plug-ins

An Analytic Workspace Manager plug-in enables you to run Java code in the context of Analytic Workspace Manager. With a plug-in, you can implement user interfaces for programs that perform actions such as the following:

- Create new types of calculations
- Create forecasts
- Create custom OLAP metadata objects, such as an enterprise-specific time dimension

In an Analytic Workspace Manager plug-in, you can use the following Java APIs:

- Oracle OLAP Java API
- JDBC API
- Swing API

You can invoke OLAP DML or SQL procedures by using JDBC classes.

Enabling Analytic Workspace Manager Plug-ins

Analytic Workspace Manager has a configuration option that specifies whether or not it uses plug-ins. To enable plug-ins, from the Analytic Workspace Manager **Tools** menu, select **Configuration**, as shown in Figure 1. In the **Configuration** dialog box, select **Enable Plugins** and specify the directory that contains your plug-ins, as shown in Figure 2. Click **OK** and then exit and restart Analytic Workspace Manager.

Figure 1 Configuration Item on the Tools Menu

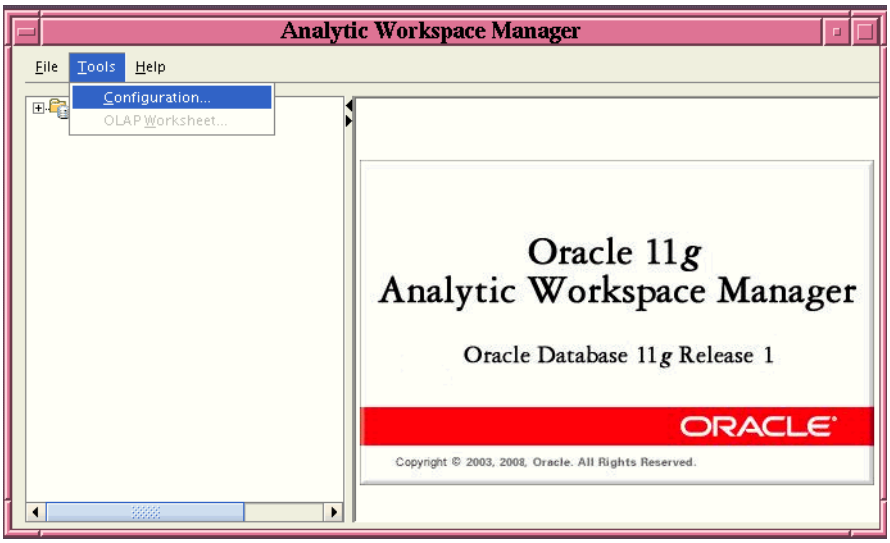
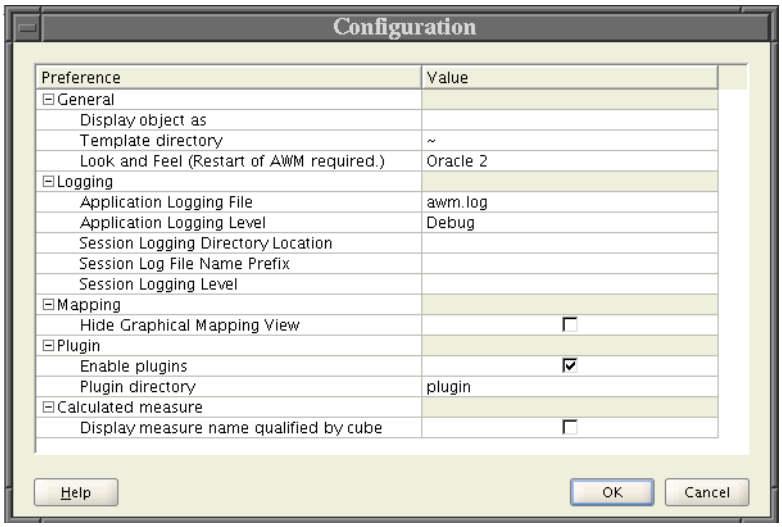


Figure 2 Configuration Dialog Box with Enable Plugins Selected



How Analytic Workspace Manager Calls a Plug-in

If Analytic Workspace Manager has plug-ins enabled, then on startup Analytic Workspace Manager dynamically loads Java code from JAR files located in the plug-ins directory. After loading the contents of the JAR files, Analytic Workspace Manager looks for classes that implement the `AWMPlugin` interface.

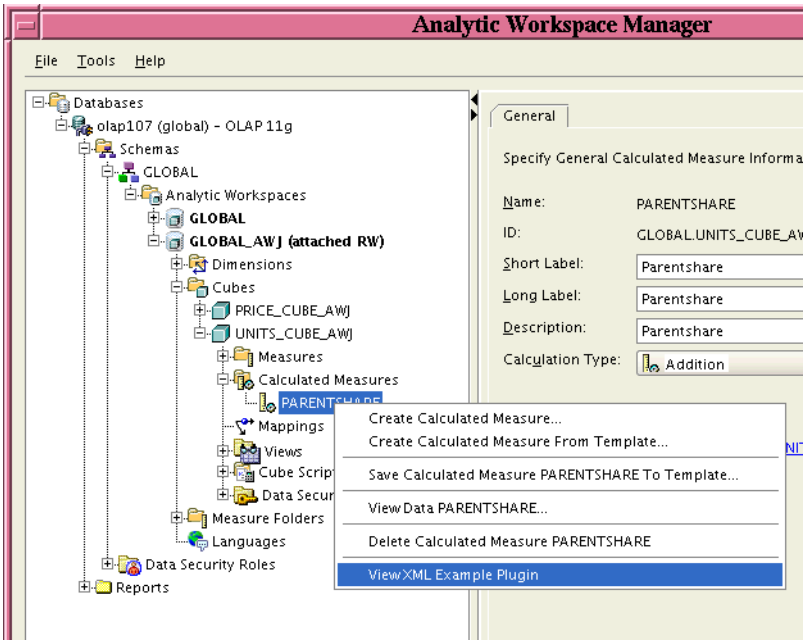
Note: You can include multiple plug-ins in a single JAR file.

When a user right-clicks an object in the Analytic Workspace Manager navigation tree, a menu appears that presents the actions available for the object. The menu also

displays the plug-ins that apply to the object. A plug-in uses the `isSupported` method to indicate whether it applies to an object in the tree.

The menu displays the text returned by the `getMenu` method of the plug-in. Figure 3 shows the menu that Analytic Workspace Manager displays for a right-click on a calculated measure in the tree. The menu includes the `ViewXMLPluginExample` example plug-in. For the code of the plug-in example, see Example 2.

Figure 3 Right-click Menu of the Navigation Tree



If the user selects the plug-in, then Analytic Workspace Manager calls the `handle` method of the plug-in. The `handle` method specifies the actions that the plug-in performs. The `refreshTree` method of the plug-in indicates whether Analytic Workspace Manager refreshes the navigation tree to include any new objects created by the plug-in.

Analytic Workspace Manager passes the following objects as input parameters to the plug-in methods:

- For the `conn` parameter, a `java.sql.Connection` object that represents the current connection to the Oracle Database instance.
- As of the 11.1.0.7 release of Oracle Database, for the `type` parameter, a `java.lang.String` object that indicates a type designation that Analytic Workspace Manager assigns to the object. For a description of type parameter values, see "Values for the type and object Parameters". Before 11.1.0.7, the type parameter was only used internally by Analytic Workspace Manager.
- For the `obj` parameter, a `java.lang.Object` that Analytic Workspace Manager associates with the object selected in the Analytic Workspace Manager navigation tree. The `Object` can be a `String`, an object from the Oracle OLAP Java API, or `null`.
- For the `aw` parameter, Analytic Workspace Manager passes in `null`. This parameter exists for compatibility with 10*g* plug-ins.

- For the `params` parameter, a `java.util.Map` object that contains the following key/object pairs:
  - The `String` `DATAPROVIDER` is the key for an `oracle.olapi.metadata.mdm.MdmMetadataProvider`.
  - The `String` `DATASOURCE` is the key for a `java.sql.DataSource`.

For the `handle` method, Analytic Workspace Manager also passes a `java.awt.Frame` object that the plug-in can use as the parent frame for user interface components.

Analytic Workspace Manager does not pass any user identification or password to the plug-in. It only passes the connection object. An Analytic Workspace Manager plug-in does not allow you to do anything that you cannot do by writing a standalone Java program.

Steps in Creating a Plug-in

The prerequisites for creating an Analytic Workspace Manager plug-in are the following:

- Include the `AWMPlugin` interface class in your development environment. You can download a JAR file that contains the `AWMPlugin.class` file from the Oracle Technology Network (OTN) Web site for Oracle OLAP at `http://www.oracle.com/technology/products/bi/olap/index.html`. You can also download the `AWMPlugin.java` file itself from that site.
- Include the `awxml.jar` and `olap_api.jar` files in your development environment. The `olap_api.jar` contains the classes in the Oracle OLAP Java API. The `awxml.jar` contains the `class` file for the `oracle.AWXML.AW` class, which the `AWMPlugin` interface includes for compatibility with the 10*g* release of Analytic Workspace Manager. These JAR files are located in the `/olap/api/lib` directory under the *ORACLE_HOME* directory in an Oracle Database installation.
- Compile the code with JDK 1.5.

> **Note:** Only plug-ins compiled with JDK 1.5 are compatible with Analytic Workspace Manager in 11*g* Release 1 (11.1).

To create an Analytic Workspace Manager plug-in, do the following:

1. Create a class that implements the `AWMPlugin` interface.
   - In the `isSupported` method, specify the objects in the navigation tree to which the plug-in applies.
   - Have the `getMenu` method return the text to display on the right-click menu for navigation tree objects that the plug-in supports.
   - In the `handle` method, include the code for the operations that the plug-in performs.
   - Have the refreshTree method return a boolean that specifies whether or not to refresh the navigation tree.
2. Using JDK 1.5, compile the plug-in and any other classes that it uses.
3. Deploy the plug-in and other classes to a JAR file. You can include more than one plug-in in the same JAR file.

4. Put the JAR file in the plug-ins directory.
5. Start Analytic Workspace Manager.

> **Note:** Analytic Workspace Manager only loads the contents of the JAR files upon startup, so if you put a new or updated version of a JAR file in the plug-ins directory, then you must restart Analytic Workspace Manager.

Values for the type and object Parameters

For the `type` parameter of the methods of an `AWMPlugin` implementation, Analytic Workspace Manager passes to the plug-in a label that identifies the type of the navigation tree object for which the plug-in is invoked. For the `obj` parameter of the methods, Analytic Workspace Manager passes an `Object`, which is a `java.lang.String` or an OLAP metadata object, or `null`.

A plug-in can use the `type` value to distinguish between the navigation tree objects that are associated with the same metadata object. For example, for all of the top-level navigation tree objects under a dimension, Analytic Workspace Manager passes as the `obj` parameter the same `MdmPrimaryDimension` object, but it passes a different `type` label for each navigation tree object.

Table 1 shows the `type` parameter values and `obj` parameter objects that Analytic Workspace Manager passes to the plug-in for the selected navigation tree object. The indentation of objects in the Navigation Tree Object column indicates the hierarchy of the tree. Text in italics indicates a variable object name. The `AW` object is an `oracle.olapi.metadata.deployment.AW` object. The other metadata objects, such as `MdmStandardDimension` and `MdmCube`, are classes in the `oracle.olapi.metadata.mdm` package. The Reports object and all of the objects under it have the same type.

Table 1 Type Values and Objects for Navigation Tree Objects

Navigation Tree Object	type Parameter Value	obj Parameter Object
Databases	`Databases`	`null`
Database name	`DATABASE`	`String` *Database identifier*
Schemas	`SCHEMA_FOLDER`	`String` *Database identifier*
Schema name	`SCHEMA`	`String` *Schema name*
Analytic Workspaces	`WORKSPACE_FOLDER`	`String` *Schema name*
Analytic workspace name	`WORKSPACE`	`AW`
Dimensions	`DIMENSION_FOLDER`	`AW`
Dimension name	`DIMENSION`	`MdmStandardDimension` or `MdmTimeDimension`
Levels	`DIMENSION_LEVEL_FOLDER`	`MdmStandardDimension` or `MdmTimeDimension`
Level name	`DIMENSION_LEVEL`	`MdmDimensionLevel`
Hierarchies	`DIMENSION_HIERARCHY_FOLDER`	`MdmStandardDimension` or `MdmTimeDimension`
Hierarchy name	`DIMENSION_HIERARCHY`	`MdmLevelHierarchy` or `MdmValueHierarchy`
Attributes	`DIMENSION_ATTRIBUTE_FOLDER`	`MdmStandardDimension` or `MdmTimeDimension`

Table 1 (Cont.) Type Values and Objects for Navigation Tree Objects

Navigation Tree Object	type Parameter Value	obj Parameter Object
Attribute name	DIMENSION_ATTRIBUTE	MdmBaseAttribute
Mappings	DIMENSION_MAP	MdmStandardDimension or MdmTimeDimension
Views	DIMENSION_VIEW_FOLDER	MdmStandardDimension or MdmTimeDimension
View name	DIMENSION_VIEW	MdmStandardDimension or MdmTimeDimension
Data Security	DATA_SECURITY	MdmStandardDimension or MdmTimeDimension
Cubes	CUBE_FOLDER	AW
Cube name	CUBE	MdmCube
Measures	CUBE_MEASURE_FOLDER	MdmCube
Measure name	CUBE_MEASURE	MdmBaseMeasure
Calculated Measures	CUBE_DERIVED_MEASURE_FOLDER	MdmCube
Calculated measure name	CUBE_DERIVED_MEASURE	MdmDerivedMeasure
Mappings	CUBE_MAP	MdmCube
Views	CUBE_VIEW_FOLDER	MdmCube
View name	CUBE_VIEW	MdmCube
Cube Scripts	null	MdmCube
Cube script name	null	null
Data Security	DATA_SECURITY	MdmCube
Measure Folders	MEASURE_FOLDER_FOLDERS	AW
Measure folder name	null	MdmOrganizationalSchema
Languages	LANGUAGE	AW
Data Security Roles	ACL_DOCUMENT_FOLDER	null
Reports	AWMTREE_REPORT	null

Analytic Workspace Manager Plug-in Interface and Example

This section contains the specification for the `AWMPlugin` interface and an example that implements the interface.

Plug-in Interface Specification

Example 1 has the code for the interface. The example leaves out the documentation comments that appear in the `AWMPlugin.java` file that is available on the Oracle OLAP OTN Web site. The methods and their input parameters are described in "How Analytic Workspace Manager Calls a Plug-in".

Example 1 The AWMPlugin Interface

```
package oracle.olap.awm.t;

import oracle.AWXML.AW;
import java.awt.Frame;
import java.sql.Connection;
import java.util.Map;
```

```
public interface AWMPlugin
{
  boolean isSupported(Connection conn, String type, Object obj, AW aw,
                      Map params);

  String getMenu(Connection conn, String type, Object obj, AW aw,
                 Map params);

  void handle(Frame parent, Connection conn, String type, Object obj,
              AW aw, Map params);

  boolean refreshTree(Connection conn, String type, Object obj, AW aw,
                      Map params);
}
```

Example of an Analytic Workspace Manager Plug-in

Example 2 contains the code for the `ViewXMLPluginExample` class, which implements the `AWMPlugin` interface. The plug-in applies to `oracle.olap.metadata.mdm.MdmBaseMeasure` and `oracle.olap.metadata.mdm.MdmDerivedMeasure` objects, which correspond to the Measure and Calculated Measure objects, respectively, in the Analytic Workspace Manager navigation tree. The plug-in gets and displays an XML representation of the measure. For an example of the message that `ViewXMLPluginExample` displays, see Figure 4.

The example does not include the documentation comments of the methods of the `AWMPlugin` interface or the input parameters and return values of those methods. The documentation comments appear in the `ViewXMLPluginExample.java` file that is available on the Oracle OLAP OTN Web site.

Example 2 The ViewXMLPluginExample Class

```
import java.awt.BorderLayout;
import java.awt.Font;
import java.awt.Frame;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;
import java.io.IOException;
import java.sql.Connection;
import java.util.ArrayList;
import java.util.List;
import java.util.Map;
import javax.swing.JButton;
import javax.swing.JDialog;
import javax.swing.JPanel;
import javax.swing.JScrollPane;
import javax.swing.JTextArea;

import oracle.AWXML.AW;
import oracle.olap.awm.plugin.AWMPlugin;
import oracle.olapi.metadata.mdm.MdmBaseMeasure;
import oracle.olapi.metadata.mdm.MdmDerivedMeasure;
import oracle.olapi.metadata.mdm.MdmMetadataProvider;
import oracle.olapi.metadata.mdm.MdmObject;
```

```
/**
 * An implementation of the AWMPlugin interface that displays the XML
 * representation of an Oracle OLAP measure object.
 */
public class ViewXMLPluginExample implements AWMPlugin
{
  public boolean isSupported(Connection conn, String type, Object obj,
                             AW aw, Map params)
  {
    // Support MdmBaseMeasure and MdmDerivedMeasure objects.
    if (obj instanceof MdmBaseMeasure || obj instanceof MdmDerivedMeasure)
    {
      return true;
    }
    return false;
  }

  public String getMenu(Connection conn, String type, Object obj, AW aw,
                        Map params)
  {
    // Text to display on the right-click menu.
    String menu = "View XML Example Plug-in";
    return menu;
  }

  public boolean refreshTree(Connection conn, String type, Object obj, AW aw,
                             Map params)
  {
    // This example does not create new metadata objects, so return false.
    return false;
  }

  public void handle(Frame parent, Connection conn, String type, Object obj,
                     AW aw, Map params)
  {
    if (obj instanceof MdmObject)
    {
      // Get the MdmMetadataProvider to use in exporting the XML.
      Object objdp = params.get("DATAPROVIDER");
      if (objdp != null)
      {
        MdmObject mobj = (MdmObject)obj;
        MdmMetadataProvider mdp = (MdmMetadataProvider)objdp;

        // Get the XML representation of the MdmObject.
        List objects = new ArrayList();
        objects.add(mobj);
        Map renameMap = null;
        boolean includeOwnerString = true;
        String title = "XML for " + mobj.getName();
        try
        {
          String xml =
            mdp.exportFullXML(objects, renameMap, includeOwnerString);
          // Create a dialog box and display the XML.
          DisplayXMLDialog dxd = new DisplayXMLDialog(parent, title, true,
                                                      xml);
          dxd.setVisible(true);
        }
```

```
      catch (IOException ie)
      {
        //Ignore error.
      }
    }
  }

/**
 * An inner class that creates a dialog box that displays the XML.
 */
class DisplayXMLDialog extends JDialog implements ActionListener
{
  /**
   * Creates a DisplayXMLDialog for displaying the contents of the xml
   * parameter.
   *
   * @param parent A Frame that is provided by Analytic Workspace Manager.
   * @param title A String that contains text to use as the title for the
   *              dialog box.
   * @param modal A boolean that specifies whether or not the dialog box is
   *              modal.
   * @param xml A String that contains the XML to display.
   */
  public DisplayXMLDialog(Frame parent, String title, boolean modal,
                          String xml)
  {
    setLocation(200, 200);
    setTitle(title);
    setModal(modal);

    try
    {
      displayXML(xml);
    }
    catch (Exception e)
    {
      e.printStackTrace();
    }
  }

  /**
   * Creates a dialog box and displays the contents of a String.
   *
   * @param xml A String that contains the XML to display.
   */
  private void displayXML(String xml)
  {
    JTextArea ta = new JTextArea(xml);
    ta.setEditable(false);
    Font of = ta.getFont();
    Font f = new Font("Courier New", of.getStyle(), of.getSize());
    ta.setFont(f);

    JScrollPane p = new JScrollPane();
    p.getViewport().add(ta);

    JPanel buttonPane = new JPanel();
    JButton button = new JButton("Close");
    buttonPane.add(button);
```

```
      button.addActionListener(this);
      getContentPane().add(buttonPane, BorderLayout.SOUTH);

      getContentPane().add(p, BorderLayout.NORTH);
      setDefaultCloseOperation(DISPOSE_ON_CLOSE);
      pack();
      setVisible(true);
    }

    /**
     * Performs an action for the Close button.
     *
     * @param e An ActionEvent for the Close button.
     */
    public void actionPerformed(ActionEvent e)
    {
      setVisible(false);
      dispose();
    }
  }
}
```

Figure 4 illustrates the type of dialog box that `ViewXMLPluginExample` displays.

Figure 4 Dialog Box Displayed by the Example Plugin

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